ACCESSION #: 9909200104

NON-PUBLIC?: N

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Clinton Power Station PAGE: 1 OF 11

DOCKET NUMBER: 05000461

TITLE: Plant Shutdown Due to Unidentified Reactor Coolant System

Leakage from Degraded Reactor Recirculation Pump Seal

Greater Than Technical Specification Limit

EVENT DATE: 09/06/1996 LER #: 1996-010-01 REPORT DATE: 09/13/1999

OTHER FACILITIES INVOLVED: None DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 058

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(i)

LICENSEE CONTACT FOR THIS LER:

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Extension 4376

COMPONENT FAILURE DESCRIPTION:

CAUSE: X SYSTEM: AD COMPONENT: P MANUFACTURER: B265

REPORTABLE EPIX: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

The plant was in POWER OPERATION and operators were preparing to shut down the "B" reactor recirculation (RR) pump, isolate the "B" RR loop, and operate the plant with a single RR loop to reduce unidentified reactor coolant system (RCS) leakage. A

degrading RR pump seal was suspected to be the source of an increasing unidentified RCS leakage rate into the drywell floor drain sump. In the process of isolating the loop, the leakage rate increased above the Technical Specification (TS) limit and the seal experienced a rapid failure. operators attempted to control the resulting increased leakage rate to continue plant operation but the leakage rate could not be reduced to the TS limits within the Action completion time. A plant shutdown was completed per the TS Action. The event was initiated by the failure of the "B" RR pump seal. Corrective action for this event included revising procedures to require plant shutdown in response to high or low seal pressures, and valid alarms for high seal leakage and high or low seal staging flow; replacing the seal that failed; and replacing the existing seal design with an improved design.

DESCRIPTION OF EVENT

On September 5, 1996, the plant was in Mode 1 (POWER OPERATION) at 100 percent reactor [RCT] power. Operators were closely monitoring drywell floor drain BUMP flow rate instrumentation that was indicating an increasing unidentified reactor coolant system (RCS) leakage rate. The leakage rate was approaching the limits specified in Technical Specification (TS) 3.4.5, "RCS Operational Leakage." Operators were also closely monitoring indications Of continuing degradation of the "B" reactor recirculation (RR) system [AD] pump [P], 1B33-C001B, seal (SEAL). Monitoring of the seal degradation began in April 1996.

TS Limiting Condition for Operation (LCO) 3.4.5.b requires that unidentified RCS operational leakage shall not be greater than 5 gallons per minute (gpm) when the plant is in Modes 1, 2 (STARTUP), and 3 (HOT SHUTDOWN). If unidentified leakage is greater than the limit, Required Action A.1 of TS 3.4.5 requires the leakage to be reduced to within the limit within 4 hours. If the restoration time cannot be met, Required

Action C.1 requires the plant to be in Mode 3 within 12 hours, and Required Action C.2 requires the plant to be in Mode 4 (COLD SHUTDOWN) within 36 hours.

The drywell floor drain sump flow monitoring system [IJ] (using a "VI' notched weir box and capacitance-type level probe) was inoperable due to its indication providing down-scale readings. The alternate drywell floor drain sump flow monitoring system (Plant Modification LD-027, using a magnetic flow meter [MTR]) was operable and being used to monitor the unidentified leakage rate.

The drywell equipment drain sump flow monitoring system (using a weir box and "V" notch method) was unavailable but an alternate method (using sump pump run times) was available to calculate the equipment drain leakage rate (identified RCS leakage).

Illinois Power (IP) suspected that the source of the increasing unidentified RCS leakage was the degrading "B" RR system pump seal and was preparing to shut down the "B" RR pump, isolate the "B" RR system loop, and operate the plant with a single RR system loop. Isolating the "B" RR loop was expected to reduce the unidentified leakage rate. At 1800 hours, a briefing on isolating the "B" RR loop and operating with a single RR loop was completed with the operating crew and other personnel involved in the evolution to place the plant in single RR loop operation.

At 1805 hours, with unidentified leakage at 4.3 gpm and the plant at 100 percent reactor power, operators began reducing reactor power at a rate of

100 megawatts electric per hour by inserting control rods.

By 2009 hours, with the plant at 69 percent reactor power, the "B" RR pump was shut down and the loop isolation process began. The "B" RR pump discharge valve [V], 1B33-F067B, was closed. Power level decreased to 58 percent reactor power following the pump shutdown. Drywell floor drain sump flow was approximately 4.5 gpm. Pressure across the upper and

lower "B" RR pump seals began to equalize at approximately 980 pounds per square inch gauge (psig). Operators fully opened the "B" RR flow control valve [FCV], 1B33-F060B, in accordance with system operating procedure CPS 3302.01, "Reactor Recirculation." Reactor water cleanup (RT) system [CE] recirculation loop "B" suction valve 1G33-F106 was closed.

At 2030 hours with "B" RR loop temperature at about 511 degrees Fahrenheit (F), operators closed the "B" RR pump seal staging shutoff valve, 1B33-F075B, in an attempt to increase the rate of RR loop "B" cool down by forcing more cold control rod drive (CRD) system [AA] water into the partially isolated loop. The temperature of the loop had to be reduced to less than 250 degrees F to allow completion of loop isolation. The drywell floor drain sump flow rate was approximately 4.7 gpm. During this portion of the evolution, operators did not follow the steps of system operating procedure CPS 3302.01 in the required sequence. Operators Closed the "B" RR pump seal staging shutoff valve, 1B33-F075B, out of the procedure-required sequence. Condition report 1-96-09-078 was initiated to

investigate the failure to follow the procedure sequence.

By 2055 hours, the drywell floor drain sump flow rate had increased to 5.5 gpm and operators entered Required Action A.1 of TS 3.4.5 which requires unidentified RCS operational leakage to be reduced to 5 gpm or less within 4 hours. The requirements of off-normal procedure CPS 4001.01, "Reactor Coolant Leakage," were also entered at this time.

At 2110 hours, in accordance with Emergency Plan Implementing Procedure EC-02, "Emergency Classifications," operators declared an UNUSUAL EVENT due to unidentified reactor coolant system leakage greater than allowed by TS 3.4.5 and made the appropriate notifications.

At 2130 hours, operators Closed the "B" RR loop suction valve, 1B33-F023B, because they now considered the plant to be in an emergency condition. Closing the valve was not in accordance with the sequence required by system operating procedure CPS 3302.01. Condition report 1-96-09-078 was initiated to investigate the failure to follow the procedure sequence.

At 2144 hours, with the plant at 57 percent reactor power, operators noted that the increase in unidentified reactor coolant system leakage was greater than allowed by TS 3.4.5.d that requires unidentified RCS leakage to be limited to a 2 gpm or less increase within the previous 24-hour period when in Mode 1. At this time leakage was approximately 6 gpm, whereas 24 hours earlier leakage was about 3.8 gpm. Required Action B.1 of TS 3.4.5 requires verification within 4 hours that the source of the unidentified RCS operational leakage increase is not service sensitive type

304 or type 316 austenitic stainless steel. If the 4-hour time limit cannot be met, Required Action C.1 requires the plant to be in Mode 3 within 12 hours and Required Action C.2 requires the plant to be in Mode 4 within 36 hours.

At 2159 hours, operators closed CRD system supply isolation valve 1C11-F026B to shut off CRD system seal water flow (3 to 5 gpm) to the "B" RR pump after determining that the "B" RR loop was not going to depressurize and cool down with the CRD system seal water flow lined up. Operators expected that this action would reduce the unidentified RCS leakage rate into the drywell floor drain sump. Shutting off the CRD system seal water flow stopped the cooling to the seal. System operating procedure CPS 3302.01 requires the loop to be below 250 degrees F or depressurized to approximately drywell pressure before shutting off CRD system seal water flow. This prerequisite condition was not met prior to shutting off CRD System seal water flow. condition report 1-96-09-078 was initiated to investigate the failure to follow the procedure.

At about 2206 hours, drywell floor drain BUMP flow rate had decreased to approximately 5.5 gpm and "B" RR pump seal pressures were decreasing slowly.

At about 2217 hours, the "B" RR pump seal cooler (CLR) high outlet temperature annunciator [ANN] alarmed as expected since the CRD system seal water flow to the seal had been stopped.

At 2222 hours, the "B" RR pump seal experienced a rapid failure. Seal pressure rapidly decreased from about 950 psig to 280 psig within a few seconds, and the drywell cooler drain high flow alarm [ALM] annunciated. Drywell cooler drain flow reached a peak of 3.5 gpm. Drywell pressure started to increase from 0.26 psig, so operators started the "B" hydrogen mixing compressor (CMP) to pump drywell atmosphere into the suppression pool and reduce drywell pressure. The operators ordered an evacuation of the containment as required by off-normal procedure CPS 4001.01. Condition report 1-96-09-075 was initiated to investigate the failure of the "B" RR pump seal.

At 2223 hours, the alternate drywell floor drain sump flow monitoring system was indicating 17.98 gpm and "white data" (meaning indication is no longer dependable). Since no direct indication for the drywell floor drain sump flow rate was available, the operations shift supervisor (SS) directed the shift technical advisor (STA) to begin performing manual calculations to determine the leakage rate. The STA used the drywell floor drain sump pump run times to perform the calculations.

At 2226 hours, operators stopped the "B" hydrogen mixing compressor with drywell pressure at 0.40 psig. Drywell pressure had reached a peak of 0.45 psig. Drywell pressure continued to decrease to 0.12 psig as steam was being condensed. The drywell vacuum breakers did not open during this event.

At 2255 hours, the upper and lower "B" RR pump seal pressures were about

120 psig. At this time, operators recognized that the "white data" indication meant that the alternate drywell floor drain sump flow monitoring system indication was inoperable and entered Required Action A.1 of TS 3.4.7, "Reactor Coolant System Leakage Detection Instrumentation." Required Action A.1 requires restoration of the drywell floor drain sump flow monitoring system to an operable status within 30 days. Condition Report 1-96-09-134 was initiated to investigate an inadequate evaluation of Plant Modification LD-027 by the

Training Department that resulted in operators not being trained on the 8 gpm limitation of the alternate drywell floor drain sump flow monitoring system.

At about 2300 hours, the STA reported to the SS that the manual calculation of leakage identified drywell floor drain sump flow rate was approximately 15.7 gpm, down from an apparent peak rate of 38.1 gpm, and the leakage rate was decreasing. The total RCS leakage rate was determined by using an assumed identified RCS leakage rate into the drywell equipment drains of about 8 to 10 gpm (the normal/historical leakage rate) and adding that value to the 38.1 gpm unidentified RCS leakage rate. On the basis of this information, the SS and the STA determined that the total leakage rate was about 48 gpm, and that the 50 gpm total leakage rate action level for declaration of an ALERT had not been met. The SS and the STA incorrectly assumed the value for drywell equipment drain leakage rate, did not verify

it by calculation, and did not continue to track the total leakage rate.

Condition report 1-96-09-137 was initiated to investigate the failure to track total leakage, monitor drywell equipment drain leakage, and verify equipment drain leakage by calculation.

The system engineer notified operators that the range of the alternate drywell floor drain sump flow monitoring system was limited to a maximum of 8 gpm.

At 2330 hours, the drywell floor drain sump flow rate was calculated to be 14 gpm. The oncoming and off-going operating crews conducted their shift turnover.

On September 6, 1996 at about 0000 hours, the off-going operating crew held a critique of this event. The critique did not identify any procedure violations or the failure to track and confirm the value of identified RCS leakage through the drywell equipment drain monitoring system. Outside organizations such as the Licensing, training, and Nuclear Assessment departments were invited to, but did not attend the critique.

At 0014 hours, the drywell floor drain sump flow rate was manually calculated to be 10.5 gpm and steady.

At about 0039 hours, the operating crew completed a double isolation of the reactor water cleanup (RT) System [CE] from the "B" RR loop by closing the RT recirculation loop A suction valve 1G33-F100 and the RT recirculation suction throttle valve 1G33-F102. The double isolation was performed to reduce any leakage that could be occurring through RT recirculation loop

"BI suction valve 1G33-F106. No change in drywell floor drain sump flow was noted following the double isolation. The double isolation of the RT system was an action not addressed by system operating procedure CPS 3302.01. The double isolation was considered a non-proceduralized direction. Non-proceduralized directions that are not contrary to the procedure may be followed for simple activities, but Must be documented in the main control room journal. The non-proceduralized direction to close valves 1G33-F100 and 1G33-F102 was not documented in the journal and the system was left in a configuration that was not in accordance with the procedure for about 19 hours. Condition report 1-96-09-079 was initiated to investigate the adequacy of the procedural guidance that allowed the uncontrolled configuration.

At 0055 hours, the 4-hour completion time expired for restoring drywell floor drain sump flow rate to 5 gpm or less per TS 3.4.51, Required Action A.1, and operators entered the shutdown requirement of TS 3.4.5, Required Action C.1. An orderly shutdown was started in accordance with integrated operating procedure CPS 3005.01, "Unit Power Changes."

At 0228 hours, with the plant at 55 percent reactor power, a briefing was held for operators to discuss the reactor Shutdown; subsequently, operators began inserting control rods for the shutdown.

At 0310 hours, the reactor power reduction was stopped at 38 percent reactor power. The change in reactor power between 0228 and 0310 hours was

greater than 15 percent. Integrated operating procedure CPS 3005.01, "Unit Power Changes," requires that Chemistry be notified to take gaseous effluent samples for analysis when the change in reactor power is more than 15 percent in one hour. Chemistry was not notified to take samples and no samples were taken. condition report 1-96-09-045 was initiated to investigate the failure to notify Chemistry.

At 0320 hours, operators shut down the "1B" turbine [TRB] driven reactor feed [SJ] pump.

At 0449 hours, the "All RR PUMP Was downshifted to Slow speed and the plant was at 27 percent reactor power.

At 0516 hours, operators began inserting control rods to decrease reactor power, and at 0530 hours, control rod insertion was stopped with the plant at 23 percent reactor power.

At 0612 hours, the operating crew's attention was diverted when a fire in the Service Building basement was reported to the Main Control Room and the fire brigade was dispatched. The fire brigade found light smoke, but no flame coming from a security system bypass power conditioner.

At 0623 hours, operators entered Emergency Operating Procedure (EOP) CPS 4402.01, "EOP-6 Primary Containment Control," in response to a high suppression pool level alarm. Water level in the suppression pool was greater than 19 feet, 5 inches. TS 3.6.2.2, "Suppression Pool Water Level," requires suppression pool water level to be between 18 feet, 11 inches and 19 feet, 5 inches. If water level is not within the limits,

Required Action A.1 of TS 3.6.2.2 requires restoration to within the limits within 2 hours. If Required Action A.1 is not met, Required Action B.1

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requires the plant to be placed in Mode 3 within 12 hours, and Required Action B.2 requires the plant to be placed in Mode 4 within 36 hours. The level increase was caused by safety relief valve leakage unrelated to this event and water entering the suppression pool from flushing a cycled condensate [KA] header in the Containment in preparation for replacement of the "B" RR pump seal. The entry into Required Action A.1 of TS 3.6.2.2 was required to be documented in the main control room journal, but was not. Condition report 1-96-09-115 was initiated to investigate the failure to document the entry into the TS action requirement in the journal.

At 0644, operators started the "B" train of the residual heat removal (RHR) system [BO] in the suppression pool cooling mode to lower the pool level.

At 0653 hours, operators exited EOP CPS 4402.01 when suppression pool level decreased below 19 feet, 5 inches.

At 0717 hours, operators shut down the "B" RHR train and stopped lowering suppression pool level.

At 0730 hours, the oncoming and off-going operating crews conducted their shift turnover.

At 0920 hours, with the plant at 23 percent reactor power, operators began inserting control rods, and by 0930 hours, the plant was less than 20

percent reactor power.

At 0945 hours, while attempting to transfer the "1B" 6.9 kilovolts non-vital bus [BU] from the unit auxiliary transformer (UAT) [XFMR] to the reserve auxiliary transformer (RAT), as part of the normal unit shutdown sequence, an operator turned the control switch [HS] slightly past its neutral position when returning the switch to neutral from the close position, momentarily de-energizing the bus. The main feed breaker [BKR] automatically closed and re-energized the bus. The "A" generator stator cooling pump [TJ] automatically started. The "B" circulating water system pump [KE], the "B" and "C" RT pumps, and the "All electrode boiler [BLR] [SA] tripped off. Operators entered off normal procedure CPS 4200.01, Los of AC Power." Condition report 1-96-09-020 was initiated to track an investigation of the control switch manipulation error.

At 1108 hours, with the plant at 17 percent reactor power, the main turbine was taken off line.

At 1125 hours, while attempting to transfer Main Turbine steam [TC] seals to the Auxiliary Steam system [SA], Auxiliary Steam to Gland Seal Supply Valve 1GS041 would not open remotely from the Main Control Room. operators de-energized the feeder breaker to the valve and manually opened it. Maintenance Work Request D61643 was initiated to investigate and correct this issue.

At 1154 hours, operators were given a pre-evolution briefing on the planned reactor scram.

At 1206 hours, operators initiated a manual reactor scram in accordance with integrated operating procedure CPS 3006.01, "Unit Shutdown," and Required Action C.1 of TS 3.4.5 due to unidentified RCS leakage greater than 5 gpm, and greater than 2 gpm increase in unidentified leakage within the previous 24-hour period while in Mode 1. The plant entered Mode 3.

At 1207 hours, reactor water level decreased to the low reactor water level (Level 3) trip setpoint. In response to the Level 3 trip, containment isolation valves [ISV] in Groups 2 (RHR to upper containment pools), 3 (RHR shutdown cooling), and 20 (miscellaneous) automatically received closed signals as designed. Operators entered EOP procedure CPS 4401.01, "EOP-1 RPV Control." Reactor water level recovered above the Level 3 trip setpoint so operators exited the EOP. Operators did not complete the required off-normal procedure checklist CPS 4001.02C001, "Automatic Isolation Checklist," for the automatic isolation. Condition report 1-96-10-001 was initiated to investigate the failure to complete the checklist.

At 1435 hours, operators exited off-normal procedure CPS 4200.01.

At 1530 hours, the oncoming and off-going operating crews conducted their shift turnover.

By 1933 hours, drywell floor drain sump flow rate decreased to 2 gpm due to the lower reactor vessel pressure. The alternate drywell floor drain sump flow monitoring system was considered operable.

At 2118 hours, the "B" RHR train was placed in shutdown cooling. At 2316

hours, the plant entered Mode 4 (COLD SHUTDOWN). No other automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No other equipment or components were inoperable at the start of this event to the extent that their inoperable condition contributed to this event.

CAUSE OF EVENT

This event was initiated by the failure of the "B" RR pump seal. The "B" RR pump seal has a history of recurring failures. Contributing causes of the seal failure include the higher operating duty imposed in recent years from increased discharge throttling of the Pumps for fuel management purposes and power reductions for monthly surveillances, the presence of a slightly bowed pump shaft in the "B" RR pump, excessive clearance in the pump bearing housing to stuffing box, and occasional high particulate concentration in the seal water.

The Clinton Power Station (CPS) Quality Assurance Department (QA) performed an in-depth assessment of this event and provided the results in a letter (U-602643) dated September 22, 1996, to the Regional Administrator of NRC Region III. The assessment provides additional details of this event including an evaluation of the decisions made and actions taken and their basis, contingencies evaluated related to the decisions and their consequences, and management involvement and oversight.

A detailed action plan was developed in response to the QA assessment. The action plan included items required to be completed prior to plant restart

and longer term items. The action plan was provided to the NRC in letter U-602644 dated September 24, 1996. This action plan was replaced by a Startup Readiness Action Plan (SRAP) that was provided to the NRC in letter U-602670 dated December 9, 1996. The SRAP was incorporated into the Strategic Recovery Plan which established a Long Term Improvement Plan (LTIP) and restart readiness reviews. This information was provided to the NRC in letter U-602781 dated July 2, 1997. Further, CPS developed a Plan for Excellence containing recovery actions designed to achieve a level of performance needed to support safe restart and reliable operation. A summary of the Plan for Excellence was provided to the NRC in letter U-602937 dated February 19, 1998. The actions needed for plant restart were completed prior to startup.

A number of human performance issues intensified the initiating event. These issues are described in the QA assessment and addressed in the action plan.

CORRECTIVE ACTION

Condition Report 1-96-09-075, Failure of "B" RR pump seal: System operating procedure CPS 3302.01, "Reactor Recirculation (RR)," has been revised to provide limitations that ensure the plant is shut down before excessive seal degradation occurs. The procedure requires an orderly plant shutdown in response to high or low seal pressures, and valid alarms for high seal leakage and high or low seal staging flow in accordance with annunciator

response procedures CPS 5003.04, Windows 4E and 4L, and CPS 5003.05, Windows 5E and 5L.

The "B" RR pump was partially disassembled and inspected in accordance with Maintenance Work Order (MWO) D75975. Engineering Change Notice (ECN) 30914 was issued to restore the pump bearing housing to stuffing box clearances to design values and evaluate the bowed shaft. The pump bearing housing was modified to improve the fit and center the bearing in the pump stuffing box. The pump seal was replaced with a rebuilt seal of the current design.

CPS is planning to replace the existing PUMP seal design with an improved design that can tolerate the CPS operating conditions. The basic seal design has been used successfully at other plants including a BWR-6 plant. The seal design will be tested to ensure it meets performance objectives.

CPS has determined that the current seal design, in conjunction with the operating procedure limitation changes discussed above, is acceptable for continued use.

The "A" RR pump was inspected in accordance with MWO D86125 for out-of-tolerance conditions similar to those found on the "B" RR pump. As a result of this inspection, the "A" RR pump seal was rebuilt.

Final post modification/maintenance runs of the "A" and "B" RR pumps were completed with satisfactory results.

Condition Report 1-96-09-078, Failure to follow the procedures: On-shift, active licensed and non-licensed personnel attended a seminar that emphasized procedural adherence and conservative decision making.

Condition Report 1-96-09-134, Inadequate evaluation of Plant Modification LD-027: The individual who reviewed the modification and change documents failed to identify that the Drywell floor drain sump flow monitoring system flow indication was clamped at 8 gpm. Licensed operators have been trained on Plant Modifications LD-027 and LD-028. Plant Modification LD-027 was modified to provide the capability for measuring drywell floor drain leakage over a range of 0 to 64 gpm. Plant Modification LD-028 was designed and installed to replace the unreliable "V" notched weir box and capacitance-type level probe method of drywell floor drain sump flow detection. The LD-028 modification consists of a bubbler level detection instrument loop and a Programmable Logic Controller.

Condition Report 1-96-09-137, Failure to track total leakage, monitor drywell equipment drain leakage, and verify equipment drain leakage by calculation: The Leak Detection system procedures were reviewed and revised for clarity, consistency, and ease of use. Surveillance procedure CPS 9000.01D001, "Control Room Surveillance Log - Mode 1, 2, 3," and system operating procedure CPS 3315.02, "Leak Detection (LD)," were revised to include steps for manual calculation of Drywell leakage rate.

This issue was discussed with the SS and the STA involved in this event during the fact finding for this event. Operating crews were trained on the Leak Detection system and the revised procedures.

Condition Report 1-96-09-079, Double isolating valves without procedure

guidance: Interim guidance on how to proceed in the absence of procedure guidance was provided in an operations Night Order issued on November 22, 1996. Guidance on how to proceed in the absence of procedure guidance is now contained in Conduct of Operations procedure CPS 1401.06, "Procedures and operator Aids."

Condition Report 1-96-09-045, Failure to notify Chemistry to take gaseous effluent samples: On-shift, active licensed, and non-licensed personnel attended a seminar that addressed concerns related to procedural adherence and conservative decision-making.

Condition Report 1-96-09-115, Failure to document the entry into the Technical Specification Required Action: The failure to document the entry into the Technical Specification action requirement in the main control room journal was the result of a lack of attention to detail. The failure to make the journal entry was discussed with the shift personnel involved. Recent log-keeping issues are being investigated and corrected in accordance with condition report 1-98-12-279.

Condition Report 1-96-09-020, Control switch manipulation error: The Shift Manager discussed this error with the involved operator at the time of its occurrence, emphasizing the importance of operating switches and controls in a smooth and deliberate manner.

Condition Report 1-96-10-001, Failure to complete automatic isolation checklist: An Operations Night Order was issued to inform operations personnel of the missed action and remind them of their responsibility to

complete required actions.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(i)(A) due to the completion of a reactor shutdown required by Required Action C.1 of TS 3.4.5.

The total RCS leakage during this event was within the design limits of the plant. When the leakage could not be reduced to within the TS limitations, the operating crew shut down the reactor in accordance with the TS Required Actions. The drywell floor drain sump flow monitoring system (weir box and "V" notch method) was inoperable prior to the start of this event and continued to be inoperable throughout this event. The alternate drywell floor drain sump flow monitoring system was inoperable from 2223 hours on September 5, 1996, until 1933 hours on September 6, 1996. Leakage rates above 8 gpm were manually calculated.

ADDITIONAL INFORMATION

The "B" RR pump is model 20 x 20 x 33, type RV, single suction, single stage, vertical, double volute, manufactured by Bingham-Willamette Company (now Sulzer Bingham).

LERs 88-031, 89-002, 89-022, and 94-008 discuss issues involving reactor recirculation pump seal leaks or replacement. However, the RR PUMP seal issues were not causes of any of these events.

For further information regarding this event, contact J. P. Earl,

Operations Projects, at (217) 935-8881, extension 4376.

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